

Division 3. Air Resources Board

Chapter 9. Off-Road Vehicles and Engines Pollution Control Devices

Article 1. Small Off-Road Engines

§ 2407. New Engine Compliance and Production Line Testing--New Small Off-Road Engine Selection, Evaluation, and Enforcement Action.

(a) Compliance Test Procedures.

(1) The Executive Officer may, with respect to any new engine family or subgroup being sold, offered for sale, or manufactured for sale in California, order an engine manufacturer to make available for compliance testing and/or inspection a reasonable number of engines, and may direct that the engines be delivered to the state board at the Haagen-Smit Laboratory, 9528 Telstar Avenue, El Monte, California or where specified by the Executive Officer. The Executive Officer may also, with respect to any new engine family or subgroup being sold, offered for sale, or manufactured for sale in California, have an engine manufacturer compliance test and/or inspect a reasonable number of engines at the engine manufacturer's facility under the supervision of an ARB Enforcement Officer. Engines must be selected at random from sources specified by the Executive Officer according to a method approved by the Executive Officer, that, insofar as practical, must exclude engines that would result in an unreasonable disruption of the engine manufacturer's distribution system.

A subgroup may be selected for compliance testing only if the Executive Officer has reason to believe that the emissions characteristics of that subgroup are substantially in excess of the emissions of the engine family as a whole.

(2) For all 1995 and subsequent small off-road engines selected for compliance testing, the selection and testing of engines and the evaluation of data must be made in accordance with the procedures set forth herein.

(3) These procedures are applicable, commencing with the 1995 calendar year, to any engine family or any subgroup within an engine family selected for compliance testing pursuant to this section.

(4) All testing must be conducted in accordance with the applicable calendar year (for 1995-1999) or model year (for 2000 and later) certification emission test procedures. Any adjustable engine parameters must be set to values or positions that are within the range available to the ultimate purchaser as determined by the ARB Enforcement Officer. For example, an engine carburetor with an adjustable idle fuel/air mixture must be compliance tested at any mixture position requested by the ARB Enforcement Officer that is within the range of adjustment available to the end-use operator. Engine service accumulation (i.e., break-in) before testing may be performed on test engines to the same extent it is performed on production line testing engines (See subsection (d)). No break-in or modifications, adjustments, or special preparation or maintenance will be allowed on engines chosen for compliance testing without the written consent of the Executive Officer. Such consent must not be unreasonably withheld where such adjustment or alteration is required to render the engine testable and reasonably operative.

(5) If the engine manufacturer elects to specify a different break-in or adjustments, they will be performed by the engine manufacturer under the supervision of ARB personnel.

(6) Correction of damage or maladjustment that may reasonably be found to have resulted from shipment of the engine is permitted only after test of the engine, except where 100 percent of the engine manufacturer's production is given that inspection or maintenance by the engine manufacturer's own personnel. The engine manufacturer may request that the engine be repaired from shipping damage, and be retested. If the Executive Officer concurs, the engine may be retested, and the original test results may be replaced by the after-repair test results.

(7) Engines must be randomly chosen from the selected engine family or subgroup. Each chosen engine must be tested according to the "California Exhaust Emission Standards and Test Procedures for 1995 and Later Small Off-Road Engines" ("Emission Standards and Test Procedures"), adopted March 20, 1992, and last amended March 23, 1999, to determine its emissions. Unique specialty hardware and personnel normally necessary to prepare the engine for the performance of the test as set forth in the Procedures must be supplied by the engine manufacturer within seven days after the request for such speciality hardware or personnel. Failure to supply this unique specialty hardware or personnel may not be used by the engine manufacturer as a cause for invalidation of the subsequent tests.

(8) Engines must be tested in groups of five until a "Pass" or "Fail" decision is reached for each pollutant independently for the engine family or subgroup in accordance with the following table:

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<i>Number of Engines Tested</i>	<i>Decide "Fail" If "U" is greater than or equal to</i>	<i>Decide "Pass" If "U" is less than or equal to</i>
5	2.18	-0.13
10	2.11	0.51
15	2.18	0.88
20	2.29	1.16

where:

$$U = \frac{\sum_{i=1}^n (x_i - \mu_r)}{\sqrt{\sum_{i=1}^n (x_i - \mu_r)^2}}^{0.5}$$

x_i = the projected emissions of one pollutant for the i th engine tested.

μ_r = the applicable calendar year emission standard for that pollutant.

n = the number of engines tested.

(9) The Executive Officer will find that a group of engines has failed the compliance testing pursuant to the above table if the Executive Officer finds that the average emissions of the engines within the selected engine family or subgroup exceed the applicable calendar year new engine emission standard for at least one pollutant.

(10) If no decision can be reached after 20 engines have been tested, the Executive Officer will not make a "Fail" decision for the selected engine family or subgroup on the basis of these 20 tests alone. Under these circumstances the Executive Officer will elect to test 10 additional engines. If the average emissions from the 30 engines tested exceed any one of the exhaust emission standards for which a "Pass" decision has not been previously made, the Executive Officer will render a "Fail" decision.

(11) If the Executive Officer determines, in accordance with the procedures set forth in Subsection (a) that an engine family or any subgroup within an engine family, exceeds the emission standards for one or more pollutants, the Executive Officer will:

(A) Notify the engine manufacturer that the engine manufacturer may be subject to revocation or suspension of the Executive Order authorizing sales and distribution of the noncompliant engines in the State of California, or enjoined from any further sales or distribution, of the noncompliant engines in the State of California pursuant to Section 43017 of the Health and Safety Code. Prior to revoking or suspending the Executive Order, or seeking to enjoin an engine manufacturer, the Executive Officer will consider production line test results, if any, and any additional test data or other information provided by the engine manufacturers and other interested parties, including the availability of emission reductions credits to remedy the failure.

(B) Notify the equipment manufacturer that the equipment manufacturer may be subject to being enjoined from any further sales, or distribution, of the equipment manufacturer's equipment product line(s) that are, or utilize engines that are, noncompliant with the applicable emission regulations pursuant to Section 43017 of the Health and Safety Code. Prior to revoking or suspending the Executive Order, or seeking to enjoin an equipment manufacturer, the Executive Officer will consider production line test results, if any, and any additional test data or other information provided by the equipment manufacturer and other interested parties, including the availability of emissions reduction credits to remedy the failure.

(12) Engines selected for inspection must be checked to verify the presence of those emissions-related components specified in the engine manufacturer's application for certification, and for the accuracy of any adjustments, part numbers and labels specified in that application. If any engine selected for inspection fails to conform to any applicable law in Part 5 (commencing with Section 43000) of Division 26 of the Health and Safety

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Code, or any regulation adopted by the state board pursuant thereto, other than an emissions standard applied to new engines to determine "certification" as specified in Chapter 9, the Executive Officer will:

(A) Notify the engine manufacturer and may seek to revoke or suspend the Executive Order authorizing sales and distribution or enjoin the engine manufacturer from any further sales, or distribution, of the applicable noncompliant engine families or subgroups within the engine families in the State of California pursuant to Section 43017 of the Health and Safety Code. Before revoking or suspending the Executive Order authorizing sales and distribution of the applicable noncompliant engine families or subgroups within the State of California, or seeking to enjoin an engine manufacturer, the Executive Officer will consider any information provided by the engine manufacturer and other interested parties, including the availability of emissions reductions credits to remedy the failure.

(B) Notify the equipment manufacturer and may seek to revoke or suspend the Executive Order authorizing sales and distribution or enjoin the equipment manufacturer from any further sales, or distribution, in the State of California of the equipment manufacturer's equipment product line(s) that are, or utilize engines that are, noncompliant with the applicable emission regulations pursuant to Section 43017 of the Health and Safety Code. Before revoking or suspending the Executive Order authorizing sales and distribution of the applicable noncompliant equipment, or seeking to enjoin an equipment manufacturer, the Executive Officer will consider any information provided by the equipment manufacturer and other interested parties, including the availability of emissions reductions credits to remedy the failure.

(b) 1996 and Subsequent Calendar (Model) Year Quality-Audit Production Line Test Procedures

(1) Small off-road engines produced in the 1996 and subsequent calendar (or model) years, that have been certified for sale in California, are subject to the quality-audit requirements specified in (b) and (d). Each engine manufacturer must use the quality-audit test procedures as specified in (b) and (d) unless it can satisfactorily provide an alternate method that shows an equivalent assurance of compliance. The purpose of providing alternate sampling, testing methods, and procedures is to help reduce sample size and testing costs, while providing a reasonable assurance that production engines comply with the applicable emission standards. The engine manufacturer must submit the method of quality-audit to the Executive Officer for approval no later than 90 days prior to 1996 calendar year production, or any subsequent calendar or model year production, as applicable, if a change is proposed.

(2) Engine Sample Selection

(A) Except as provided in subsection (b)(3), the engine manufacturer must randomly select one percent of the California sales volume of engines from each engine family for quality-audit testing. Additional engine sample criteria appear in subsection (d)(3).

(B) The Executive Officer may, upon notice to the engine manufacturer, require the sample rate to be increased to a maximum of ten percent of production (not to exceed 30 additional engines or units of equipment) of the calendar quarterly production of any engine family.

(3) Alternate Quality-Audit Engine Selection Criteria For The 1996 Through 1999 Calendar Years

(A) An engine manufacturer may use the alternate engine selection method outlined in this Subsection.

(B) Engines or equipment must be randomly selected at a rate of 1.0 percent of engine family production at the beginning of production. When test results of the first 10 engines or units of equipment have been accumulated, an evaluation as indicated below must be made.

(C) Calculate the family mean and standard deviation of each pollutant (HC, CO, NO_x and PM, if applicable). Identify engines or units of equipment that have emission levels greater than three standard deviations above the mean. Eliminate these emission data points and recalculate the mean and standard deviation. Continue the calculation until there are no values greater than three standard deviations above the mean. Count the number of these data points greater than the emission standard (outliers). If the number of outliers is equal to or less than the allowable number in Table 1 for each pollutant, the engine family is eligible to continue to a second evaluation, shown in paragraph (D) below. Otherwise, sampling must continue at a rate of 1.0 percent of production for the rest of the month.

(D) If the allowable outlier criterion is met, the family mean standard deviation, and sample size determined for each contaminant before excluding any outliers, are substituted in the following expression:

$$\frac{(\text{emission standard} - \text{mean}) (N)^{0.5}}{(\text{standard deviation})}$$

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(E) If the expression is greater than C in Table 2 below, and the engine manufacturer reasonably estimates that the quarterly engine family production will exceed 5,000 engines or units of equipment, the sampling rate for the remaining portion of the calendar month following the date of selection of the last of the 10 engines or equipment is 10 per month, applied on a prorated basis. If the expression is greater than C in Table 2 below, and the engine manufacturer reasonably estimates that the quarterly engine family production will be 5,000 engines or units of equipment or less, the sampling rate for the remaining portion of the calendar month following the date of selection of the last of the 10 engines or equipment is 5 per month, applied on a prorated basis. If the expression is equal to or less than C in Table 2, the sampling rate continues to be 1.0 percent of production for the remaining portion of the month in which selection of the 10 engines or equipment is completed. The value of C is a function of the coefficient of variation (standard deviation/mean). The coefficient of variation and "C" must be rounded to the number of decimal places shown in Table 2.

Table 1

<i>Sample Size</i>	<i>Allowable Outliers</i>	<i>Sample Size</i>	<i>Allowable Outliers</i>
1-32	1	430-478	11
33-68	2	479-528	12
69-107	3	529-578	13
108-149	4	579-629	14
150-193	5	630-680	15
194-238	6	681-731	16
239-285	7	732-783	17
286-332	8	784-835	18
333-380	9	836-887	19
381-429	10	888-939	20

Table 2

<i>Coefficient of Variation</i>	<i>C</i>
0.1	0.5
0.2	1.2
0.3	1.8
0.4	2.5
0.5	3.1
0.6	3.8
0.7	4.4
0.8	5.1
0.9	5.7

(F) At the conclusion of each month of quarterly engine family production, the emission test data must be evaluated in order to determine the sampling rate as set forth in Paragraphs C and D above. This evaluation must utilize all test data accumulated in the applicable quarter. The sample rate for the next month of production must be determined as follows: ten (10) engines per month when the engine manufacturer's estimated quantity of quarterly engine family production is greater than 5,000; five (5) engines per month when the engine manufacturer's estimated quantity of quarterly engine family production is equal to or less than 5,000; or, one (1) percent of the quarterly engine family production as determined by the sampling evaluation method set forth in Paragraphs D and E.

(G) For each subsequent quarter, the preceding sample selection method must be followed. The sample rate determination for the first month of each subsequent quarter must be based on the accumulated data from the previous quarter. The sample rate for the succeeding months of the quarter must be determined as previously set forth.

(H) If the start of production does not coincide with the first of a quarter, the sequence for sample rate determination must be followed, but references to remaining calendar months may not be appropriate.

(I) Where an engine manufacturer has sampled engines or equipment at a rate of 5 per month following a reasonable estimate that the quarterly engine family production will be 5,000 engines or units of equipment or less, and subsequently determines, or reasonably should determine based on information available to the engine

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manufacturer, that the quarterly engine family production will exceed 5,000 engines or units of equipment, the engine manufacturer must increase the sampling rate for the quarter such that the requirements of Paragraph D applicable to families reasonably estimated to exceed a quarterly production of 5,000 engines or units of equipment are satisfied.

(4) Compliance Evaluation

(A) Each engine manufacturer must review the test results of the first 10 test engines or equipment of each engine family, from each calendar quarter of production or from the start of calendar year production. It must also review the quarter's cumulative test results of each engine family at the end of each month. If 10 or more engines or units of equipment have been tested, the engine manufacturer must notify the Chief of the Mobile Source Operations Division, in writing within ten working days whenever an engine family exceeds an emission standard.

(B) At the end of the quarter, all of the data accumulated during the quarter are evaluated, and the compliance of the engine family with the family emission levels or emission standards, whichever is applicable, is determined. If a sample size for a particular production quarter is less than ten engines, the data from that quarter must be combined with all of the data from each successive quarter of the calendar year until data from at least ten engines that have been quality-audit tested are included in the quarterly evaluation. If the sample size for the first quarter's production for a calendar year does not contain at least ten engines, the data available for that quarter are evaluated. However, compliance of the engine family with the family emission levels or emission standards, whichever is applicable, is not determined until subsequent quarterly production data is available that includes evaluations of at least ten engines. If the sample size for the last final quarter's production for a calendar year does not contain at least ten engines, the data from the last final quarter must be combined with all the data from each preceding quarter of the calendar year until the sample size contains at least ten engines.

(C) When the average value of any pollutant that is rounded off to the same number of significant digits as is the standard, in accordance with ASTM E 29-93a (May 1993), exceeds the applicable family emission level or emission standard, whichever is applicable; or, when the engine manufacturer's submitted data reveal that the production line tests were performed improperly, the engine family may be determined to be in noncompliance. The Executive Officer will follow the manufacturer notification procedures in section (d)(5).

(D) A failed engine is one whose emission test results for a regulated pollutant exceeds the emission standard or FEL, as applicable.

(5) Reports

(A) Each engine manufacturer shall submit a written report to the ARB within 45 calendar days of the end of each calendar quarter.

(B) The quarterly report shall include the following:

(i) The total production and sample size for each engine family.

(ii) engine identification numbers and explanation of the identification code.

(iii) The applicable emissions standards or Family Emission Levels for each engine family.

(iv) A description of each test engine or equipment (i.e., date of test, engine family, engine size, engine or equipment identification number, fuel system, dynamometer power absorber setting in horsepower or kilowatts, engine code or calibration number, and test location).

(v) The exhaust emission data for PM, CO, NO_x and HC for each test engine or equipment. The data reported shall provide two significant figures beyond the number of significant figures in the applicable emission standard.

(vi) The retest emissions data, as described in paragraph (v) above for any engine or unit of equipment failing the initial test, and description of the corrective measures taken, including specific components replaced or adjusted.

(vii) A statistical analysis of the quality-audit test results for each engine family stating:

1. Number of engines or units of equipment tested.

2. Average emissions and standard deviations of the sample for HC, CO, NO_x and PM.

(viii) Every aborted test data and reason for the aborted test.

(ix) The applicable quarterly report shall include the date of the end of the engine manufacturer's calendar year (for 1995-1999) or model year (for 2000 and subsequent years) production for an engine family.

(x) The required information for all engine families in production during the quarter regardless of sample size.

(xi) The start and stop dates of batch-produced engine family production.

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(C) Each engine manufacturer shall submit a copy of the report that has been stored (e.g., computer discs), or may be transmitted, in an electronically digitized manner, and in a format that is specified by the Executive Officer. This electronically based submission is in addition to the written submission of the report.

(c) 2000 and Subsequent Model Cumulative Sum Production Line Test Procedures.

(1) The 2000 and subsequent model year small off-road engines, that have been certified for sale in California, are subject to production line testing performed according to either the Cumulative Sum requirements specified in (c) and (d), or to the Quality-Audit requirements specified in paragraph (b) and (d). At the time of certification, the engine manufacturer must designate which production line testing procedure, either Quality-Audit or Cumulative Sum, it will use for the model year. If an engine manufacturer uses the Cumulative Sum procedures, it must use the Cumulative Sum test procedures as specified herein.

(2) Engine Sample Selection

(A) At the start of each model year, the small off-road engine manufacturer will begin to randomly select engines from each engine family for production line testing, according to the criteria specified herein. Additional engine sample criteria appear in subsection (d)(3).

(i) For newly certified engine families: After two engines are tested, the manufacturer will calculate the required sample size for the model year according to the Sample Size Equation in paragraph (B) of this section.

(ii) For carry-over engine families: After one engine is tested, the manufacturer will combine the test with the last test result from the previous model year and then calculate the required sample size for the model year according to the Sample Size Equation in paragraph (B) of this section.

(B)(i) Manufacturers will calculate the required sample size for the model year for each engine family using the Sample Size Equation below. N is calculated from each test result. The number N indicates the number of tests required for the model year for an engine family. N, is recalculated after each test. Test results used to calculate the variables in the Sample Size Equation must be final deteriorated test results as specified in paragraph (c)(4)(C).

$$N = \left[\frac{(t * F)^2}{(x - FEL)} \right] + 1$$

where:

N = required sample size for the model year.

t₉₅ = 95% confidence coefficient. It is dependent on the actual number of tests completed, n, as specified in the table in paragraph (B)(ii) of this section. It defines one-tail, 95% confidence intervals.

F = actual test sample standard deviation calculated from the following equation:

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$$\sigma = \sqrt{\frac{\sum (X_i - x)^2}{n - 1}}$$

- X_i = emission test result for an individual engine
 x = mean of emission test results of the actual sample
 FEL = Family Emission Level, or emission standard if no Family Emission level is established
 n = The actual number of tests completed in an engine family

(iii) Actual Number of Tests (n) & 1-tail Confidence Coefficients (t₉₅)

n	t ₉₅	n	t ₉₅	n	t ₉₅
2	6.31	12	1.80	22	1.72
3	2.92	13	1.78	23	1.72
4	2.35	14	1.77	24	1.71
5	2.13	15	1.76	25	1.71
6	2.02	16	1.75	26	1.71
7	1.94	17	1.75	27	1.71
8	1.90	18	1.74	28	1.70
9	1.86	19	1.73	29	1.70
10	1.83	20	1.73	30	1.70
11	1.81	21	1.72	∞	1.645

(iii) A manufacturer must distribute the testing of the remaining number of engines needed to meet the required sample size N, evenly throughout the remainder of the model year.

(iv) After each new test, the required sample size, N, is recalculated using updated sample means, sample standard deviations and the appropriate 95% confidence coefficient.

(v) A manufacturer must continue testing and updating each engine family's sample size calculations according to paragraphs (B)(i) through (B)(iv) of this section until a decision is made to stop testing as described in paragraph (B)(vi) of this section or a noncompliance decision is made pursuant to paragraph (c)(3)(A)(v) of this section.

(vi) If, at any time throughout the model year, the calculated required sample size, N, for an engine family is less than or equal to the actual sample size, n, and the sample mean, x, for each regulated pollutant is less than or equal to the emission standard (or FEL, as applicable) for that pollutant, the manufacturer may stop testing that engine family except as required by paragraph (c)(3)(A)(vi).

(vii) If, at any time throughout the model year, the sample mean, x, for any regulated pollutant is greater than the emission standard (or FEL, as applicable), the manufacturer must continue testing that engine family at the appropriate maximum sampling rate.

(viii) The maximum required sample size for an engine family

(regardless of the required sample size, N, as calculated in paragraph (B)(i) of this section) is thirty tests per model year.

(ix) Manufacturers may elect to test additional randomly chosen engines. All additional randomly chosen engines tested in accordance with the testing procedures specified in the Emission Standards and Test Procedures must be included in the Sample Size and Cumulative Sum equation calculations as defined in paragraphs (B)(i) and (c)(3)(A)(i) of this section, respectively.

(C) The manufacturer must produce and assemble the test engines using its normal production and assembly process for engines to be distributed into commerce.

(D) No quality control, testing, or assembly procedures will be used on any test engine or any portion thereof, including parts and subassemblies, that have not been or will not be used during the production and assembly of all other engines of that family, unless the Executive Officer approves the modification.

(3) Calculation of the Cumulative Sum Statistic

(A) Each engine manufacturer must review the test results using the following procedure:

(i) Manufacturers must construct the following Cumulative Sum Equation for each regulated pollutant for each engine family. Test results used to calculate the variables in the Cumulative Sum Equation must be final deteriorated test results as defined in paragraph (c)(4)(C).

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$$C_i = \max [0 \text{ or } (C_{i-1} + X_i - (\text{FEL} + F))]$$

where:

- C_i = The current Cumulative Sum statistic
- C_{i-1} = The previous Cumulative Sum statistic. Prior to any testing, the Cumulative Sum statistic = 0 (i.e. $C_0 = 0$)
- X_i = The current emission test result for an individual engine
- FEL = Family Emission Level, or emission standard if no Family Emission level is established
- F = $0.25 \times \bar{F}$

After each test, C_i is compared to the action limit, H , the quantity that the Cumulative Sum statistic must exceed, in two consecutive tests, before the engine family may be determined to be in noncompliance for purposes of paragraphs (c)(3)(A)(iv) and (c)(3)(A)(v).

H = The Action Limit. It is $5.0 \times s$, and is a function of the standard deviation, s .

\bar{F} = is the sample standard deviation and is recalculated after each test.

(ii) After each engine is tested, the Cumulative Sum statistic must be promptly updated according to the Cumulative Sum Equation in paragraph (i) of this section.

(iii) If, at any time during the model year, a manufacturer amends the application for certification for an engine family as specified in Part I, Sections 28 and 29 of the Emission Standards and Test Procedures by performing an engine family modification (i.e., a change such as a running change involving a physical modification to an engine, a change in specification or setting, the addition of a new configuration, or the use of a different deterioration factor), all previous sample size and Cumulative Sum statistic calculations for the model year will remain unchanged.

(iv) A failed engine is one whose final deteriorated test results pursuant to paragraph (c)(4)(C), for a regulated pollutant exceeds the emission standard or the FEL, as applicable, for that pollutant.

(v) An engine family may be determined to be in noncompliance, if at any time throughout the model year, the Cumulative Sum statistic, C_i , for, a regulated pollutant is greater than the action limit, H , for two consecutive tests.

(vi) The engine manufacturer must perform a minimum of two tests per engine family per quarter, regardless of whether the conditions of paragraph (c)(2)(B)(iv) have been met.

(vii) All results from previous quarters of the same model year must be included in the on-going Cumulative Sum analysis, provided that the engine family has not failed (e.g., if three engines of a family were tested in the first quarter, the first test of the second quarter would be considered as the fourth test).

(viii) If the Cumulative Sum analysis indicates that an engine family has failed, the engine manufacturer must notify the Chief of the Mobile Source Operations Division, in writing and by telephone, within ten working days. Corrective action will be taken as noted in paragraph (d)(5), below.

(ix) If a manufacturer performs corrective action on a failed engine family and then resumes production, all previous tests will be void, and Cumulative Sum analysis will begin again with the next test.

(B) At the end of the quarter, or when the Cumulative Sum analysis indicates that a decision has been made, the manufacturer must provide all the data accumulated during the quarter.

(4) Calculation and Reporting of Test Results.

(A) Initial test results are calculated following the applicable test procedure specified in "California Exhaust Emission Standards and Test Procedures for 1995 and Later Small Off-Road Engines." The manufacturer rounds these results, in accordance with ASTM E29-93a, to the number of decimal places contained in the applicable emission standard expressed to one additional significant figure. (ASTM E29-93a has been incorporated by reference.)

(B) Final test results are calculated by summing the initial test results derived in paragraph (A) of this section for each test engine, dividing by the number of tests conducted on the engine, and rounding in accordance with ASTM E29-93a to the same number of decimal places contained in the applicable standard expressed to one additional significant figure.

(C) The final deteriorated test results for each test engine are calculated by applying the appropriate deterioration factors, derived in the certification process for the engine family, to the final test results, and rounding

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in accordance with ASTM E29-93a to the same number of decimal places contained in the applicable standard expressed to one additional significant figure.

(D) If, at any time during the model year, the Cumulative Sum statistic exceeds the applicable action limit, H, in two consecutive tests, the engine family may be determined to be in noncompliance and the manufacturer must notify the Chief of the Mobile Source Operations Division and the Manager of the New Vehicle Audit Section, 9528 Telstar Avenue, El Monte, CA, 91731, within ten working days of such exceedance by the Cumulative Sum statistic.

(E) Within 45 calendar days of the end of each quarter, each engine manufacturer must submit to the Executive Officer a report that includes the following information unless the Executive Officer has approved the omission of some of the information:

(i) The location and description of the manufacturer's or other's exhaust emission test facilities that were utilized to conduct testing reported pursuant to this section;

(ii) Total production and sample sizes, N and n, for each engine family;

(iii) The applicable emissions standards or Family Emissions Levels for each engine family;

(iv) A description of the process to obtain engines on a random basis;

(v) A description of the test engines or equipment (i.e., date of test, engine family, engine size, engine or equipment identification number, fuel system, dynamometer power absorber setting in horsepower or kilowatts, engine code or calibration number, and test location);

(vi) The date of the end of the engine manufacturer's model year production for each engine family;

(vii) For each test conducted,

1. A description of the test engine, including:

(I) Configuration and engine family identification,

(II) Year, make, and build date,

(III) Engine identification number and explanation of the identification code, and

(IV) Number of hours of service accumulated on engine prior to testing;

2. Location where service accumulation was conducted and description of accumulation procedure and schedule;

3. Test number, date, test procedure used, initial test results before and after rounding, and final test results for all exhaust emission tests, whether valid or invalid, and the reason for invalidation, if applicable;

4. The exhaust emission data for PM, CO, NO_x and HC (or NMHC, as applicable) for each test engine or equipment. The data reported must provide two significant figures beyond the number of significant figures in the applicable emission standard;

5. The retest emissions data, as described in Paragraph 4. above for any engine or unit of equipment failing the initial test, and description of the corrective measures taken, including specific components replaced or adjusted;

6. A complete description of any adjustment, modification, repair, preparation, maintenance, and/or testing that was performed on the test engine, was not reported pursuant to any other part of this article, and will not be performed on all other production engines;

7. A Cumulative Sum analysis, as required in paragraph (c)(3), of the production line test results for each engine family;

8. Any other information the Executive Officer may request relevant to the determination whether the new engines being manufactured by the manufacturer do in fact conform with the regulations with respect to which the Executive Order was issued;

(viii) For each failed engine as defined in paragraph (c)(3)(A)(iv), a description of the remedy and test results for all retests;

(ix) Every aborted test data and reason for the aborted test;

(x) The start and stop dates of batch-produced engine family production;

(xi) The required information for all engine families in production during the quarter regardless of sample size; and

(F) Each manufacturer must submit a copy of the report that has been stored (e.g., computer disc), or may be transmitted, in an electronically digitized manner, and in a format that is specified by the Executive Officer. This electronically based submission is in addition to the written submission of the report.

(d) Procedures Applicable to All Production Line Testing

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(1) Standards and Test Procedures. The emission standards, exhaust sampling and analytical procedures are those described in the Emission Standards and Test Procedures, and are applicable to engines tested only for exhaust emissions. The production line test procedures are specified in conjunction with the Emission Standards and Test Procedures. An engine is in compliance with these production line standards and test procedures only when all portions of these production line test procedures and specified requirements from the Emission Standards and Test Procedures are fulfilled, except for the provisions as follows:

(A) A handheld equipment engine manufacturer, or, for the 2000 and subsequent model years, a manufacturer of engines 65 cc or below, may request that the Executive Officer allow the values of rated engine power and speed determined in the engine family certification be used in lieu of the determination of the engine power and speed of a production line engine. This request must include a specification of the particular power absorption device (e.g., dynamometer, water brake, etc.) used to apply the test load to the production engines. An engine manufacturer must request and must receive approval from the Executive Officer for this allowance before the production line tests are conducted. The engine manufacturer should establish equivalent assurance of compliance by providing emission data from a statistically valid sample of engines for comparison between the proposed procedures and the required procedures.

(B) Any adjustable engine parameters must be set to any value or position that is within the range available to the ultimate purchaser.

(2) Air Resources Board (ARB) personnel and mobile laboratories must have access to engine or equipment assembly plants, distribution facilities, and test facilities for the purpose of engine selection, testing, and observation. Scheduling of access must be arranged with the designated engine manufacturer's representative and must not unreasonably disturb normal operations (See Section 31 of the Emission Standards and Test Procedures).

(3) Engine Sample Selection

(A) The engine manufacturer must randomly select engines according to (b)(3) or (c)(2), as applicable, from each engine family for production line testing. The engines must be representative of the engine manufacturer's California sales. Each engine will be selected from the end of the assembly line. All engine models within the engine family must be included in the sample pool. Each selected engine for quality-audit testing must pass the inspection test, by being equipped with the appropriate emission control systems certified by the ARB. The procedure for randomly selecting engines or units of equipment must be submitted to the Chief, Mobile Source Operations Division, 9528 Telstar Avenue, El Monte, CA, 91731, prior to the start of production for the first year of production.

(B)(i) Prior to the beginning of the 2000 model year, if an engine manufacturer cannot provide actual California sales data, it must provide its total production and an estimate of California sales at the end of the model year. The engine manufacturer must also provide supporting material for its estimate.

(ii) For the 2000 and later model years, engine manufacturers must provide actual California sales, or other information acceptable to the Executive Officer, including, but not limited to, an estimate based on market analysis and federal production or sales.

(4) Engine Preparation and Preconditioning

(A) No emissions tests may be performed on an engine prior to the first production line test.

(B) The engine or unit of equipment must be tested after the engine manufacturer's recommended break-in period. The engine manufacturer must submit to the Executive Officer the schedule for engine break-in and any changes to the schedule with each quarterly report. This schedule must be adhered to for all production line testing within an engine family and subgroup or engine family and assembly plant as appropriate.

(C) If an engine or unit of equipment is shipped to a remote facility for production line testing, and adjustment or repair is necessary because of such shipment, the engine manufacturer must perform the necessary adjustments or repairs only after the initial test of the engine or equipment. Engine manufacturers must report to the Executive Officer in the quarterly report, all adjustments or repairs performed on engines or equipment prior to each test. In the event a retest is performed, a request may be made to the Executive Officer, within ten days of the production quarter, for permission to substitute the after-repair test results for the original test results. The Executive Officer will either affirm or deny the request by the engine manufacturer within ten working days from receipt of the request.

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(D) If an engine manufacturer determines that the emission test results of an engine or unit of equipment are invalid, the engine or equipment must be retested. Emission results from all tests must be reported. The engine manufacturer must include a detailed report on the reasons for each invalidated test in the quarterly report.

(5) Manufacturer Notification of Failure

(A) The Executive Officer will notify the engine manufacturer that the engine manufacturer may be subject to revocation or suspension of the Executive Order authorizing sales and distribution of the noncompliant engines in the State of California, or being enjoined from any further sales, or distribution, of the noncompliant engines in the State of California pursuant to Section 43017 of the Health and Safety Code. Prior to revoking or suspending the Executive Order, or seeking to enjoin an engine manufacturer, the Executive Officer will consider all information provided by the engine manufacturer, and other interested parties, including, but not limited to corrective actions applied to the noncompliant engine family, and for 2000 and subsequent model year engines, the availability of emissions reduction credits to remedy the failure.

(B) The Executive Officer will notify the equipment manufacturer that the equipment manufacturer may be subject to revocation or suspension of the Executive Order authorizing sales and distribution, or being enjoined from any further sales, or distribution, of the equipment manufacturer's equipment product line(s) that are, or utilize engines that are, noncompliant with the applicable emission regulations pursuant to Section 43017 of the Health and Safety Code. Prior to revoking or suspending the Executive Order, or seeking to enjoin an equipment manufacturer, the Executive Officer will consider all information provided by interested parties, including, but not limited to corrective actions applied to the noncompliant engine family, and for 2000 and subsequent model year engines, the availability of emissions reduction credits to remedy the failure.

(6) Suspension and Revocation of Executive Orders.

(A) The Executive Order is automatically suspended with respect to any engine failing pursuant to paragraph (c)(3)(A)(iv) or (b)(4)(D) effective from the time that testing of that engine is completed.

(B) The Executive Officer may suspend the Executive Order for an engine family that is determined to be in noncompliance pursuant to paragraph (c)(3)(A)(v) or (b)(4)(C). This suspension will not occur before fifteen days after the engine family is determined to be in noncompliance. Before revoking or suspending the Executive Order authorizing sales and distribution of the applicable noncompliant engine families or subgroups within the State of California, or seeking to enjoin an engine manufacturer, the Executive Officer will consider any information provided by the engine manufacturer and other interested parties, including the availability of emissions reductions credits to remedy the failure.

(C) If the results of testing pursuant to these regulations indicate that engines of a particular family produced at one plant of a manufacturer do not conform to the regulations with respect to which the Executive Order was issued, the Executive Officer may suspend the Executive Order with respect to that family for engines manufactured by the manufacturer at all other plants.

(D) Notwithstanding the fact that engines described in the application for certification may be covered by an Executive Order, the Executive Officer may suspend such Executive Order immediately in whole or in part if the Executive Officer finds any one of the following infractions to be substantial:

(i) The manufacturer refuses to comply with any of the requirements of this section;

(ii) The manufacturer submits false or incomplete information in any report or information provided to the Executive Officer under this section;

(iii) The manufacturer renders inaccurate any test data submitted under this section;

(iv) An ARB enforcement officer is denied the opportunity to conduct activities authorized in this section and a warrant or court order is presented to the manufacturer or the party in charge of the facility in question;

(v) An ARB enforcement officer is unable to conduct activities authorized in paragraph (d)(2) of this section because a manufacturer has located its facility in a foreign jurisdiction where local law prohibits those activities.

(E) The Executive Officer will notify the manufacturer in writing of any suspension or revocation of an Executive Order in whole or in part. A suspension or revocation is effective upon receipt of the notification or fifteen days from the time an engine family is determined to be in noncompliance pursuant to paragraph (c)(3)(A)(v) or (b)(4)(C), whichever is later, except that the Executive Order is immediately suspended with respect to any failed engines as provided for in paragraph (A) of this section.

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(F) The Executive Officer may revoke an Executive Order for an engine family after the Executive Order has been suspended pursuant to paragraph (B) or (C) of this section if the proposed remedy for the nonconformity, as reported by the manufacturer to the Executive Officer, is one requiring a design change or changes to the engine and/or emission control system as described in the application for certification of the affected engine family.

(G) Once an Executive Order has been suspended for a failed engine, as provided for in paragraph (A) of this section, the manufacturer must take the following actions before the Executive Order is reinstated for that failed engine:

- (i) Remedy the nonconformity;
- (ii) Demonstrate that the engine conforms to the emission standards by retesting the engine in accordance with these regulations; and
- (iii) Submit a written report to the Executive Officer, after successful completion of testing on the failed engine, that contains a description of the remedy and test results for each engine in addition to other information that may be required by this part.

(H) Once an Executive Order for a failed engine family has been suspended pursuant to paragraph (B), (C) or (D) of this section, the manufacturer must take the following actions before the Executive Officer will consider reinstating the Executive Order:

(i) Submit a written report to the Executive Officer that identifies the reason for the noncompliance of the engines, describes the proposed remedy, including a description of any proposed quality control and/or quality assurance measures to be taken by the manufacturer to prevent future occurrences of the problem, and states the date on which the remedies will be implemented; and

(ii) Demonstrate that the engine family for which the Executive Order has been suspended does in fact comply with the regulations of this part by testing as many engines as needed so that the Cumulative Sum statistic, as calculated in paragraph (c)(3)(A)(i), falls below the action limit, or the average emissions from the Quality-Audit testing as calculated in paragraph (b)(4)(C) remains below the emission standard or FEL, as applicable. Such testing must comply with the provisions of this section. If the manufacturer elects to continue testing individual engines after suspension of an Executive Order, the Executive Order is reinstated for any engine actually determined to be in conformance with the emission standards through testing in accordance with the applicable test procedures, provided that the Executive Officer has not revoked the Executive Order pursuant to paragraph (F) of this section.

(I) Once the Executive Order has been revoked for an engine family, if the manufacturer desires to continue introduction into commerce of a modified version of that family, the following actions must be taken before the Executive Officer may issue an Executive Order for that modified family:

(i) If the Executive Officer determines that the proposed change(s) in engine design may have an effect on emission performance deterioration, the Executive Officer will notify the manufacturer, within five working days after receipt of the report in paragraph (H)(i) of this section, whether subsequent testing under this section will be sufficient to evaluate the proposed change or changes or whether additional testing will be required; and

(ii) After implementing the change or changes intended to remedy the nonconformity, the manufacturer must demonstrate that the modified engine family does in fact conform with the regulations of this section by testing as many engines as needed from the modified engine family so that the Cumulative Sum statistic, as calculated in paragraph (c)(6)(A)(i) falls below the action limit, or the average emissions from the Quality-Audit testing as calculated in paragraph (b)(4)(C) remains below the emission standard or FEL, as applicable. When both of these requirements are met, the Executive Officer will reissue the Executive Order or issue a new Executive Order, as the case may be, to include that family. As long as the Cumulative Sum statistic remains above the action, or the average emissions from the Quality-Audit testing exceeds the emission standard or FEL, as applicable, the revocation remains in effect.

(J) At any time subsequent to a suspension of an Executive Order for a test engine pursuant to paragraph (A) of this section, but not later than 15 days (or such other period as may be allowed by the Executive Officer) after notification of the Executive Officer's decision to suspend or revoke an Executive Order in whole or in part pursuant to paragraphs (B), (C), or (F) of this section, a manufacturer may request a hearing as to whether the tests have been properly conducted or any sampling methods have been properly applied.

(K) Any suspension of an Executive Order under paragraph (D) of this section:

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(i) must be made only after the manufacturer concerned has been offered an opportunity for a hearing conducted in accordance with all applicable requirements and;

(ii) need not apply to engines no longer in the possession of the manufacturer.

(L) After the Executive Officer suspends or revokes an Executive Order pursuant to this section and prior to the commencement of a hearing, if the manufacturer demonstrates to the Executive Officer's satisfaction that the decision to suspend or revoke the Executive Order was based on erroneous information, the Executive Officer will reinstate the Executive Order.

(M) To permit a manufacturer to avoid storing non-test engines while conducting subsequent testing of the noncomplying family, a manufacturer may request that the Executive Officer conditionally reinstate the Executive Order for that family. The Executive Officer may reinstate the Executive Order subject to the following condition: the manufacturer must commit to recall all engines of that family produced from the time the Executive Order is conditionally reinstated if the Cumulative Sum statistic does not fall below the action limit, or the average emissions from the Quality-Audit testing remains above the emission standard or FEL, as applicable, and must commit to remedy any nonconformity at no expense to the owner.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43102 and 43104, Health and Safety Code. Reference: Sections 43013, 43017, 43018, 43101, 43102, 43104, 43150-43154, 43205.5 and 43210-43212, Health and Safety Code.

REFERENCE